Amendments to the Specification

Replace the paragraph on page 7, lines 1-19 with the following paragraph:

overall length and wherein the homogenizer comprising two zones: (i) a spacer zone having a length, L1, extending from the reaction chamber ~~chamber~~ entrance and ending where one or more reactant inlet tubes' are positioned, after having passed through a wall of the reaction chamber, to deliver one or more reactants into the reaction chamber so the reactants contact the hot carrier gas and (ii) a homogenization zone extending from the reactant inlet tubes' location to a position down stream of the quench gas inlets; and wherein carrier gas and reactants mix and react in the homogenization zone and pass through the flow homogenization exit nozzle to enter a quench zone of the reaction chamber defined by the quench gas inlet location in a reaction chamber wall and the reaction chamber outlet and wherein L1 of the spacer zone must be long enough to have the hot gas flow attached to walls of the reaction chamber before the hot gas reaches the reactant inlets and the overall length (L1 + L2) of the reaction chamber is designed to a residence time sufficient that the following three tasks are completed before gas flow exiting the homogenizer: (1) gas flow in the reaction chamber has achieved a one-dimensional flow and concentration profile; and (2) gas-phase nucleation of product particles has been initiated.

Replace the paragraph on page 7, lines 22-38 with the following paragraph:

(a) introducing a carrier gas into a reactor chamber having (i) axially spaced inlet and outlet ends along the reactor axis wherein positioned at the inlet end of the reactor chamber is a high temperature heating means to heat a carrier gas having a flow direction axially from the reaction chamber inlet downstream through the reaction chamber and out the chamber outlet and wherein one or more quench gas inlets are positioned up stream from the outlet end of the reactor chamber for introducing a quench gas for cooling; and (ii) a reaction chamber having an axially spaced entrance and an exit wherein in the vicinity of the exit, the homogenizer converges to nozzle tip, the entrance of the homogenizer being aligned with the inlet to the reaction chamber and the homogenizer being inserted within the reaction chamber and held in place by a homogenizer holder such that the homogenizer extends from the inlet end of the reaction chamber securely fitting against the inlet end for at least a portion of the homogenizer's overall length and wherein the homogenizer comprising two zones: (i) a spacer zone having a length, L1, extending from the reaction chamber ~~chamber~~ entrance and ending where one or

Replace the paragraph on page 9, lines 1-17 with the following paragraph:

of the reaction chamber securely fitting against the inlet end for at least a portion of the homogenizer's overall length and wherein the homogenizer comprising two zones: (i) a spacer zone having a length, L1, extending from the reaction chamber ~~chamber~~ entrance and ending where one or more reactant inlet tubes are positioned, after having passed through a wall of the reaction chamber, to deliver one or more reactants into the reaction chamber so the

reactants contact the hot carrier gas and (ii) a homogenization zone extending from the reactant inlet tubes' location to a position down stream of the quench gas inlets; and wherein carrier gas and reactants mix and react in the homogenization zone and pass through the flow homogenization exit nozzle wherein L1 of the spacer zone must be long enough to have the hot gas flow attached to walls of the reaction chamber before the hot gas reaches the reactant inlets and the overall length (L1 + L2) of the reaction chamber is designed to a residence time sufficient that before gas flow exits the homogenizer: gas flow in the reaction chamber has achieved a near one dimensional flow and concentration profile.

<u>Replace the paragraph on page 12, lines 1-13 with the following paragraph:</u>
contacting the hot carrier gas flow from the energy source, the reaction is initiated and continues as the reactants flow downstream toward reaction chamber exit 56, and into the quench zone, into the quenching chamber 30, where quenching gas 22 from tank 12 is radially introduced into the ~~the~~ quench chamber through inlets 110. Additionally, the temperature of the aerosol stream is reduced by mixing with the quenching gas. As a result the rates of particle coagulation and aggregation are reduced. Further downstream the particles are collected in the product collector 32. In the present example, a sintered metal filter is used to collect the product, although any suitable collection device, made of a suitable material, could be used. The gas flow exiting the filter is discharged into a scrubber 34. In one embodiment of this process, primary particles in the sub-50 nm range are formed with the reaction chamber.